MOE

DEVELOPMENT OF A NATIONAL SCORECARD FOR MOUNTAIN BIKE TRAILS

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ABSTRACT

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Title: Development of a National Scorecard for Mountain Bike Trails

Abstract: A number of mountain bike trail brochures and mountain bike guide books have been published which describe the attributes of trails and roads used by mountain bikes. The trails' levels of difficulty are described. Words, however, are interpreted differently among people. A trail designated as difficult may be interpreted as difficult to one rider and as most difficult to another if the attributes leading up to the rating have not been quantified.

From survey information acquired from mountain bike riders, club members, and resource managers across the country, these attibutes have been identified, quantified and incorporated into a scorecard that can be used as a tool to rate a trail's level of difficulty. Used nationally, it will be a matter of time before riders have the same interpretation of each level of difficulty as described and quantified in the scorecard. Final testing across the nation is still needed to see if the value system agrees with the all the variables found geographically.

Keywords: Bikes, Bicycles, Bicycle Trails, Mountain Bicycles, Trails.

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EXECUTIVE SUMMARY

Title: Development of a National Scorecard For Mountain Bike Trails

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Summary: This project proposes to provide the public with information that will encourage use of trails and roads in a way that will increase enjoyment and safety. To this end, the author's objectives included a survey of forest trail managers nationwide, as well as the mountain biking public. That information was balanced with the more subjective survey the author himself conducted on the trails, and the recommendations of fellow writers obtained through research. The results were then incorporated into a National Mountain Bike Scorecard that could become a tool for scoring and rating the level of difficulty of trails and roads used by mountain bikes.

Various trails and roads were ridden with a mountain bike to become familiar with a mountain bike and the various attributes of the trails as they relate to a mountain bike.

Letters, sample scorecards, and questionaires were sent out to mountain bike clubs and Forest Service recreation resource managers. These were passed on to individuals known to have an interest in mountain bikes. Their responses were summarized into useable data for ease in formulating the scorecard.

A literature search indicated a lack of information available on those quantifiable trail factors that affect the levels of difficulty for mountain bike use. Literature available was centered around topics like races, bike technology, general experiences over various trails, clothing, physical conditioning and other topics. The responses from the questionaires were extremely valuable in the scorecard development.

Contacts were made with various individuals to discuss other rating systems, the scorecards, trail attributes, and the liability of rating trails for mountain bike use.

The scorecard was the end result of information acquired from the responses to the questionaires, personal contacts,

and literature research. The values used appear to be valid, but the scorecard will still need to be tested by trail resource managers across the nation, and perhaps revised, before the public can be expected to accept, observe, and follow its guidelines. Until this is accomplished, and the scorecard accepted and used consistently, it cannot be considered a "national" scorecard in a true sense of the word.

INTRODUCTION

The abundance of information available about the use of mountain bikes centers around specific trails, various aspects of their construction, races, their use, police force use, their sales, clothing styles, and yes, even the "intimate facts" about the mountain biker. However, no standard national trail rating system was available to the public prior to this writing. In an effort to improve the enjoyment and safe use of all trails used by mountain bikes, this author conducted research and surveys, both objectively and subjectively, and subsequently developed a National Mountain Bike Trail Scorecard which will quantify and score the trail attributes that effect the ease by which trails are traversed by a mountain bike.

According to Kurt Loheit (1990), Steering Committee Member and Trail Coordinator of the Concerned Off-Road Bicylist Association (CORBA), there is a need for direction and standardization in the rating of mountain bike trails. The mountain bicyclist, new to an area, needs some information to use in making a decision on whether or not to ride a trail. Sometimes managers don't have any idea on how to rate a trail and consequently no information is provided. Value systems and their interpretation are different across the nation. Therefore, a scorecard is a major step towards providing that information.

Just what is a scorecard? A scorecard is a means of standardizing data so that everyone can arrive at the same interpretation of the information and then make personal decisions about riding the trail. In this case, a resource manager would grade or score various attributes of the trail resource according to

particular guidelines. He then would total those scores and assign a final rating to the "level of difficulty".

While a national scorecard may be new to the trail system, scorecards have been used as tools by various Regions of the US Forest Service for years to rate riparian areas, stream channel stability, and other resources. These scorecards have become tools which take much of the subjectivity out of management and provide uniformity in the way the resources are rated.

At the same time, rating a trail for mountain bike use does not preclude rating or using the same trail for other purposes. The trail scorecard rates the trail for that use and that use only.

Obviously, there are many factors to consider when developing a scorecard. In particular, it must be kept simple. A scorecard that is difficult to use would soon find itself idle in a handbook on the shelf. If accepted and used nationally, it will only be a matter of time before riders have the same interpretation of the levels of difficulty as described and quantified in the scorecard. Of course, the ultimate goal is that the scorecard increase the enjoyment and safe use of the trails because riders use it to make appropriate decisions. Moreover, as the use of scorecards become accepted and widespread, additional trail use may be the result.

DEMAND

A National Mountain Bike Trail Scorecard, developed for and applied to all roads and trails (hereafter referred to only as trails) in the United States,

can be a national system that will develop a common language among the mountain bike enthusiasts and in doing so, will promote understanding. It was noted that the scorecards used for rating riparian areas in the Region 2 of the Forest Service were different for various types of topography and habitats (Region 2 Forest Service Handbook 2209.14). These scorecards rate the condition of a resource but not the relationship between the resource and an activity involving people. A scorecard is needed that will incorporate needs of both managers and bikers across the nation and bring a common understanding of trail ratings to these people. It is recognized that there are different demands and different problems/conflicts associated with the management of our trails in the national forest system. The scorecard, if developed properly, may also be used as a source of information to the mountain biker in the Recreation Opportunity Guide (ROG) available at most Forest Service offices, or be used as a record to be used later in the development of a brochure or guidebook.

Most public lands are open, with few restrictions, to the mountain bike. Bikes are prohibited from the National Forest Wilderness Areas by the Wilderness Act of 1964 and by a recent revision to the Code of Federal Regulations (36 CFR 261.16) that explicitly prohibits the "possession or use of a hang glider or bicycle". However, of the 100,000 miles of trail in the national forest, approximately 68,000 miles are open to bicycles (Martin 1989). This still leaves the thousands of miles of forest roads for biking opportunity. The National Park Service also prohibits "wheeled vehicles" from many of their Parks which are considered Wilderness Area.

With the increased use of mountain bikes, many managers of public lands are thinking more of passing regulations to restrict trails to foot and/or horse travel. Bikes can still travel those areas on public lands closed to motorized vehicle use but not those closed to all vehicle use. Regulations restricting the use of mountain bikes are still few and are the exception rather than the rule.

A BRIEF HISTORY OF MOUNTAIN BIKES

The purchase and the use of mountain bikes have grown steadily since they were first introduced in the 1970's in California. Now virtually all bike manufacturers offer lines of mountain bikes that will satisfy the recreationist who has expanded his/her horizon beyond the use of motorcycles and all terrain vehicles (ATV's). Mountain bikes are free to go where motorized vehicles are not allowed. Bike owners don't have the investment and mechanical problems inherent in the latter. In fact, in many states the mountain bike has been outselling all other bicycles 10 to one (Grost 1989). The number of mountain bicycle riders in the United States has nearly tripled in the last two years, growing from 2.6 million in 1986, to more than 7 million in 1988. In 1988 alone, the (estimated) number of U.S. mountain bicyclists rose 70 percent (Blumenthal 1989).

Initially, these bikes sold for around $1400 (Hain 1987) but today may be purchased for much less and have many more amenities than their predecessors. The mountain bike is probably the most versatile bicycle ever manufactured and it will probably get better as technology grows. Indeed, it is certainly a lot more comfortable than its road counterpart. But is this bike used mostly off

the well beaten path? According to national surveys conducted by the Bicycle Institute of America, most bikers stay exclusively on pavement but if the opportunities were there, they would ride off-road (Blumenthal 1989).

According to Bill Mann (1990), bicycle shop owner in Paonia, Colorado, experience shows that 80% of the mountain users prefer smooth roads with no washboards; 15% prefer easy to moderate terrain (such as jeep roads) which require virtually no bike pushing; and 5% prefer more difficult type terrain with a single track (such as a 1/4 to 1/2 mile long dirt trail with grades of 12% or more).

OTHER RATING SYSTEMS

It helps to have some understanding of other rating systems. The author knows of no scorecard that develops the level of difficulty ratings used for mountain climbing, white water canoeing, and down hill skiing. Mountain climbing and white water canoeing are much more dangerous than mountain biking and the rating system is consequently more complex to accommodate the risk of life and the variability making up the hazards of the resource.

A white water canoeing rating system is covered by the International Scale for Grading the Difficulty of River Cruising Routes as found in Robert E. McNair's Basic River Canoeing (1972). It uses 6 different levels of difficulty.

Streams are often classified in stretches. Variability of stream condition across the United States make them hard to rate. Volumes of water in the west

makes eddies with large waves dangerous. In the east, eddies may be considered a breeze (Moon 1990).

The National Climbing Classification System (NCCS) classifies the level of difficulty of mountain climbing routes. This classification system consists of three parts: 1.) the overall difficulty of the route-grades I through IV; 2.) the level of difficulty of the most difficult free pitch-levels F1 through F10; and 3.) the level of difficulty of the most difficult artificial pitch, if any. The NCCS defines difficulty by means of example climbs. Climbers need to climb these examples to have an awareness of the rough equivalents to the NCCS in terms of their own local system.

The NCCS was designed to apply to climbing conditions all over the United States and is considered to be a true national system. With its use, it provides a common language for American mountain climbers and promotes understanding (Ortenburger 1979).

While both of the above systems are much too complex to be applied to a system of mountain bike trails, the rating system for ski trails is more simple. This system uses the following ratings as standard in the Forest Service Handbook 7109.11a: 1) easy (signed as green circles); 2) more difficult (signed as a blue square); and 3) most difficult (signed as a black diamond). These are the standard classes of difficulty as defined by the Forest Service Handbook 7109.11a.

The ski rating system is also not standard, as indicated in the Forest Service Handbook. Ski areas have additional ratings on various runs that, in

themselves, are not consistent from one ski area to another. The "standard" terms have been modified somewhat. Some ski areas use double black diamonds in addition to the single for a fourth class. Others use a black diamond with a blue circle which indicates the third class of a four class rating system (Kowinia 1990).

Though the rating system for bike trails differs from those discussed above, consistency is the key to any scorecard that will benefit resource users. By using information received from across the nation, this project will develop a scorecard that, if accepted, will provide this consistency.

METHODOLOGY

Literature Review

A literature search was conducted utilizing lecture notes acquired while attending the Clemson University Shortcourse. These notes identified the overall direction for the project.

Numerous periodicals have featured articles on mountain bikes. They include Bicycling, Boys Life, Backpacker, Ski Area Management, American Forests, Blair and Ketchum's Country Journal, Mechanics Illustrated, U.S. News and World Report, Flying, and many others. As mentioned earlier, nearly all topics were centered on the other aspects of mountain biking and provided very little information on the various components used to determine a trails level of difficulty for mountain bike use.

Several technical books on mountain bikes have also been published. They include The Mountain Bike Book by Rob Van der Plas, the Complete Book of All-Terrain Bicycles by Eugene A. Sloan and others. In addition, guidebooks are available, such as Canyon Country Mountain Biking by F.A. Barnes and Tom Kuehne and Mountain Biking the High Sierra's by Dan and Reanne Douglas.

Other books such as Basic River Canoeing by Robert E. McNair and A Climber's Guide to the Teton Range by Leigh Ortenburger provide information for rating levels of difficulty in whitewater canoeing and mountain climbing. This information is helpful as it provides some insight on how other resources are rated and can be used as a comparison in the development of this project.

Selection of a Mountain Bike

The 1989 Buyers Guide listed 302 models available for purchase, the longest list ever (Zahradnik 1989). With such a large selection available, it is easy to become confused when one considers all the makes, models, and options offered by the manufacturers. After speaking with dealers and reviewing trends and tips in various articles, the author rented a bicycle model in the mid-price range. Subsequently, two bikes have been purchased.

Fieldwork

Even before the bike was rented, the author made arrangements with a local biking enthusiast, Thurman Wilson, for a bike loan and an afternoon of riding together. Thurman explained the basic riding techniques, gearing, weight shifting, seat positioning and other tips. He also provided some literature on

mountain bikes. The sturdiness of the modern mountain bike was amazing compared to that of the road bikes from years ago. Even though this bike was more comfortable, two weeks were still required to allow a certain part of the anatomy the chance to recuperate. That was a "subtle" hint to invest in a high tech gel seat cushion that resembles flesh and takes the harshness out of a ride. As John Rankin, a bike rider in Plymouth, New Hampshire, put it, "Ninety per cent of the bicycling public - and that includes lots of people who'd like to bike but dislike road bikes - want comfort and safety, not speed. Skinny-tired bikes are really modified racing bikes, so you have to adjust to their hard ride. But an ATB (all terrain bike) feels like home when you first hop on." (Sussman 1984)

The ride brought back memories of the old balloon tire bikes that could be pedaled almost anywhere (except steep grades), including across ditches, without the worry of collapsing the wheels or frame. Very soon the mechanical advantages of the mountain bike over the older, fat-tired clunker became apparent and were without question, fantastic.

While continuing to explore the capabilities of the bike (and rider), the author began to tackle different trails to determine what was easy and what was not. Initially, however, roads with a variety of riding conditions were ridden before attempting the tougher single track trails. All offered differences in grade, pitch, tread width (and depth, as some were eroded after use), trail clearing, elevation changes, obstacles, stream crossings and, of course, the beauty of our National Forest. It was not unusual to find trails with sustained grades of 20-25% and with pitches that were even steeper. Needless to say, many of these areas required pushing the bike as one quickly tires

under these conditions. The condition of either all up or all down seems to be the norm on many trails in the Rocky Mountain area, a condition not found everywhere across the nation.

Of course, even on a mountain bike, the rider's physical conditioning was found to be the most beneficial asset when confronted with steep grades. In addition, Nelson Pena describes seven factors that can make a ride an enjoyable one. He lists: no hangovers, plenty of sleep, happiness on the job and at home, caffeine to help utilize the fatty acids in the bloodstream, good health, good environment, and good attitude (Pena 1989). However, while these factors do contribute to the enjoyment and safety of a ride, they cannot be quantified for a scorecard.

Surveying the Mountain Biking Public

A questionaire accompanied by a letter and two proposed scorecards were mailed to 56 different clubs across the nation. A copy of the letter, two proposed scorecards, and questionaire are located in Appendix 1, 3, 4, and 5. Of these questionaires, 11 were undeliverable through the mail system, while 48 failed to respond. A total of eight responses were received. A list of those organizations receiving the questionaire has been included in Appendix 6.

The questionaire, letter and the proposed scorecards were also mailed to 44 National Forests that were selected at random across the nation. This letter has been included in Appendix 2. These were sent out through their respective regional offices via the Forest Service computer network. The questionaires were then forwarded to the recreation personnel at the Forest and District

levels. At that point, forest and district personnel passed these questionaires on to those inside and outside the Forest Service who were known to have an interest in mountain biking. Responses were received from 56 individuals having various levels of experience. A list of those forests whose personnel responded and the number of responses from those forests has been included in Appendix 7. Those who responded and did not object to being quoted in this paper are listed in the bibliography.

Summary and Discussion of the Results

Very few respondents answered all the questions, while some didn't answer any questions but provided other information such as maps, brochures, etc. Some questions received more responses than others. All the responses were reviewed and similar responses summarized to provide ease in interpreting information.

The scorecard developed by this project has been included as Figure 1 on page 12. Many changes have been incorporated into this scorecard which sets it apart from its predecessors in Appendix 3 and 4. The discussion which follows will make reference to the new scorecard and how information received was incorporated into it.

A number of responses identified other criteria to rate. Some suggestions made would be appropriate for including in a mountain bike trail brochure or a mountain biking guide book. These suggestions did not relate to trail difficulty for which the scorecard is designed. The development of brochures and guidebooks may be a project other researchers might wish to pursue.

PROPOSED MOUNTAIN BIKE TRAIL SCORECARD

(Instructions on the back)

Road or Trail No.	Spur (x)___ Loop (x)___ Connecting (x)___	Forest	District	1/4 Section & Section (at point of beginning)	T___(N or S) R___(E or W) Township & Range

Trail/Road Name	Length	Max. Elevation	Min. Elevation	Examiner	Date	Total Score	Difficulty Level

	Easiest (Value 1)	Less Difficult (Value 2)	More Difficult (Value 3)	Most Difficult (Value 4)
A. Grade				
Maximum Pitch (Elev. Gain/Loss	<6% _____ (6' in 100')	<10% _____ (<10" in 100')	<18% _____ (<18' in 100')	>18%_____ (>18' in 100')
Length of Pitch	100' _____	100'_____	200' _____	250' _____
Sustained Grade (Elev. Gain/Loss	<3% _____ (<30' in 1000')	4-5% _____ (40-50' in 1000')	6-12% _____ (60-120' in 1000')	13+% _____ (130+' in 1000')
Turning Radius	Wide _____	Wide _____	Wide_____	Sharp _____
B. Clearing				
Width	>48" _____	>48" _____	>48" _____	<48" _____
C. Tread				
Width	Road _____	Road _____	Road _____	Trail_____
Surface	Smooth _____	Relatively Smooth _____	Relatively Rough Sections _____	Rough Sections w/considerable Walking and/or Portaging and poor traction _____
Stream Crossings	Rideable w/Ease _____	Rideable _____	Walkable (push) _____	Carryable _____
Total number checks:	_____	_____	_____	_____
Total Value ea. Column:	x 1 _____	x 2 _____	x 3 _____	x 4 _____

Total all Columns_____

COMMENTS:_____

Figure 1

INSTRUCTIONS

A check is to be made in the space provided for the criteria's level of difficulty. If a rated criteria is the same for more than one difficulty level, place the check at the lowest level. Total the number of checks in each column, and multply by the factor indicated for the total column value. The total of all these columns should be entered at the top of the sheet. The level of difficulty may be determined by the below scale. Soil type, amount and type rock, vegetation type, and other conditions may place rating at a higher level of difficulty . The numbers of the generic comments listed below may be noted in the comment space with any additional comments the rater desires to note.

Total Score	Level of Difficulty
7-10	Easiest
11-18	Less Difficult
19-25	More Difficult
25+	Most Difficult

ADDITONAL COMMENTS

1. Mudholes
2. Deadfalls
3. Muddy Areas
4. Rough Areas
5. Discourage use when wet
6. Conflicting use (Hikers, Horses, Joggers, etc.)
7. Poor Visibility
8. Remote
9. Sandy - poor traction
10. Trail is rutted
11. Maps, Brochures, available
12. Steep sideslopes
13. Hazardous areas

Some facts, such as length of trail and time to travel, have been included in the scorecard for information purposes. Many other items cannot be used for developing a scorecard, as they don't contribute significantly to rating difficulty. A comment section, as suggested by Kilbourne, Schuler, and Bergfeld (1990), provides the opportunity for making note of these factors. For convenience, additional information has been listed on the back of the scorecard, making it easy for the rater to select the numbered comment and insert that number in the comment section provided on the front of the scorecard.

Realistically, it was impossible to include all the responses on the scorecard. Originally, the development of a scorecard was considered to be a simple task. However, the diversity of suggestions received was surprising. These suggestions needed to be organized into a format that would be inclusive, yet simple - a challenging feat.

Consequently, all similar responses were organized by Region, Forest, State, name, and years of experience next to columns that represented different criteria. Discussions were also summarized. There seemed to be a reluctance in quantifying the criteria. As a result, the lack of this information makes it necessary for the system to be tested and the validity of the values leading up to the levels of difficulty agreed upon. The values appear to be reasonable, but testing across the country is needed to ensure they adequately describe levels of difficulty in other geographic areas.

The responses were summarized a second time. From this summary and frequent reviews of the uncondensed responses, a scorecard was finally conceived that

appears to satisfy most suggestions. The following is a discussion and summary of the ideas and suggestions received from the questionaires.

Question A. What additional criteria would you recommend (Such as stream crossings, length of trail or time to ride the trail)? What guidelines would you use in quantifying that criteria?

* Streamcrossings (15)
* Streamcrossings and season of crossing (2)
* Drinking water (3)
* Gates too hard to close (so leave open) (1)
* OK as is (2)
* Too simplistic (1)
* Keep it simple (1)
* Flat, rolling, steep grades (1)

Four tried to quantify the difficulty of stream crossings to some degree (Powers, Kreachbaum, Bannister and Shoemaker 1990).

As indicated, 15 of the respondents felt stream crossings should be a criteria included in the rating of trails. Some streams may be shallow but the rubble on the stream bottom can wedge a wheel, stop the bike, and send the rider over the handle bars for a quick "cooling". Other streams may be slow and deep, but with good traction, they may be easy to cross. Of course, one might still get his/her feet wet. One of the most resourceful ways to cross a stream was developed by a boy scout group who ford white-water streams using a rope traverse-providing the opportunity to get a free bike-wash (Stuckey 1989).

However, since stream conditions are quite varied, and because of the need to keep the scorecard simple, the general values of rideable, walkable and carryable, as suggested by Shoemaker, were used.

Question B. What rating values should be different on the proposed scorecard, and do you agree with the values?

* OK, realistic, agree (15)
* Sustained 5% grade-not for beginner (2)
* Ratings without definitions are misleading and complicated (5)
* Keep it simple (1)
* Easier is still difficult for average rider (11)
* Give information and let rider score his/her own (1)
* Make easy, real easy and hard a "heartbreaker" (3)
* Check system (1)
* Number of steep pitches rather than grade are more difficult (1)
* Length of sustained grade up to 1 mile should be rated with a 2, 4, 6, 8, and 10 (1)

Fifteen respondents agreed that the ratings were realistic for the proposed criteria. Another eleven felt the easier classification would be too difficult for the average rider. The scoring did seem to be too complicated and as a result the fifth level of difficulty was dropped, titles of the levels of difficulty changed, directions provided, and values supported by new information added. Three respondents felt "easy" should be "real easy" and the most difficult basically a "heartbreaker". One response indicated that the number of steep slopes rather than the sustained grade should be the indicator

of the level of difficulty. These differences in opinion are common from one geographical area to another where topography is quite different. These values might be an "eye opener" to those who have their own values and who think in terms of what their local conditions are.

Question C. What are your feelings on rating a trail one category lower than the most difficult stretch on that trail, if that stretch is "short" and/or infrequent? How much is short and infrequent? Do you feel the rating should be at the most difficult level no matter how short that stretch is? Is it acceptable to push the bike for short distances?

* Pushing OK (10)
* Rate trail at most difficult level (10)
* Rate trail at the lower average level (16)
* Rate lower if <100' (1)
* Rate lower if >10-20% of total (11)
* Rate lower but only if >1/3 mile (1)
* Rate lower if less than 3 times (1)
* Rate lower if <200' and occurs 1 time (1)
* Rate lower if occurs more than 2 times (1)
* Rate lower if is <1/4 mile in 5 miles (1)
* Rate lower if less than 10 yards (1)
* Rate lower and note sections (1)
* Short is 200-300', infrequent is 1-2 occurrences per mile and difficulty would need to be at least two levels higher to raise the level of of difficulty by 1 (1)
* Rate at highest level unless quantify where and how much (1)

United States Department of Agriculture | Forest Service | CARIBOU NATIONAL FOREST | 421 W. 2nd South Soda Springs ID 83276

Reply To: 2330

Date: December 1, 1989

mNAME & ADDRESSn

Dear mNAMEn,

Are you a mountain biker? Or do you have knowledge of mountain bike use? Or do you have friends who are avid bikers? If your answer to any of these questions is "yes", I need your help.

I am a 1988 graduate of the Forest Service sponsored Recreation Shortcourse held at Clemson University. Part of that course is the completion of a project which would show knowledge of or use training received from that course. I am requesting your help in completing a National Scorecard for Mountain Bike Trails, which is my project for that course.

I would very much appreciate it if you would take a few minutes to comment, suggest changes, and/or pick out the best of the two proposed scorecards enclosed for your review. A critique form and self addressed envelope have been enclosed for your convenience. You may respond as an individual, as a group, make copies for others to review and comment, and/or make changes on the scorecard itself. Your thoughts should be geared toward the average biker.

I am hoping this scorecard will help resource managers and mountain bike users come to grips with a common understanding about mountain bike trail conditions and their levels of difficulty. It is designed to be simple - not meant to consider soil types, aesthetic values and the like which would make using the scorecard cumbersome.

I would like the responses returned to me before 12/20/89 so that I can review the comments and make necessary changes during the holidays. Late responses will be accepted (if not too late!). I will be working hard over the holidays to bring the project close to completion.

Responses can either be returned by mail or sent to me via DG, address: M.Moe:R04F05D02A. In case you have problems getting through to me via DG, check with your DG System Manager and let that person know that our telenet host address for DG access is: 311020800055. If you'd rather, you can send the reply to your Regional Office and they'll forward it on to me.
The scorecard requires 15L laser printing if a hard copy is desired.

Thank you for your time and response. I wish you a very Merry Christmas and a joyous New Year.

Sincerely,

/s/ Mel Moe

MELVIN G. MOE
Forester

Enclosures

United States Department of Agriculture | Forest Service | Caribou National Forest
Soda Springs Ranger District

Reply To: 2330 Date: December 1, 1989

Subject: Mountain Bike Trail Scoreboard

To: Recreation Staff

Are you a mountain biker? Or do you have knowledge of mountain bike use? Or do you have friends who are avid bikers? If your answer to any of these questions is "yes", I need your help.

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The scorecard requires 15L laser printing if a hard copy is desired.

Thank you for your time and response. I wish you a very Merry Christmas and a joyous New Year.

Sincerely,

/s/ Mel Moe

MELVIN G. MOE
Forester

Enclosures

PROPOSED MOUNTAIN BIKE SCORECARD #1

Road or Trail No.	Length	Forest	District	1/4 Section & Section	Township & Range

Examiner	Date	Difficulty Level

	Easy (Category 1)	Easier (Category 2)	Somewhat Difficult (Category 3)	More Difficult (Category 4)	Most Difficult (Category 5)
A. Grade*					
Maximum Pitch	8%	12%	16%	20	30%
Sustained Grade	5%	8%	10%	15%	20%
Length	100'	100'	200'	250'	200'
Turning Radius	10'	10'	6'	3'	2'
B. Clearing					
Width	>48"	>48"	>48"	36-48"	36-48"
Height	>8'	>8'	>8'	<8'	<8'
C. Tread					
Width	>24"	>24"	12-24"	12"	12"
Surface	Smooth	Relatively Smooth	Relatively Rough Sections	Rough Sections w/some Walking and/or Portaging	Rough Sections w/ Considerable Walking and/or Portaging

* NOTE: Soil type, amount and type of rock, vegetation type, and other stability conditions may place rating in a higher category. Should short stretches occur where trail portions fall in a higher level of difficulty, the trail will be classified one level lower than the most difficult level on the ground.

Appendix 3

Appendix 4

PROPOSED MOUNTAIN BIKE TRAIL SCORECARD #2

Road or Trail No.	Length	Forest	District	1/4 Section & Section	Township & Range
				Total Score:	Difficulty Level
Examiner	Date	Total Score	Difficulty Level	8-11 12-20 21-27 28-34 35+	Easy Easier Somewhat Difficult More Difficult Most Difficult

	Easy (Value 1)	Easier (Value 2)	Somewhat Difficult (Value 3)	More Difficult (Value 4)	Most Difficult (Value 5)
A. Grade*					
Maximum Pitch	8% ____	12% ____	16% ____	20 ____	30% ____
Sustained Grade	5% ____	8% ____	10% ____	15% ____	20% ____
Length	100' ____	100' ____	200' ____	250' ____	200' ____
Turning Radius	10' ____	10' ____	6' ____	3' ____	2' ____
B. Clearing					
Width	>48" ____	>48" ____	>48" ____	36-48" ____	36-48" ____
Height	>8' ____	>8' ____	>8' ____	<8' ____	<8' ____
C. Tread					
Width	>24" ____	>24" ____	12-24" ____	12" ____	12" ____
Surface	Smooth ____	Relatively Smooth ____	Relatively Rough Sections ____	Rough Sections w/some Walking and/or Portaging ____	Rough Sections w/ Considerable Walking and/or Portaging ____
Column Totals:	____	____	____	____	____

* NOTE: Soil type, amount and type of rock, vegetation type, and other stability conditions may place rating in a higher category.

MOUNTAIN BIKE SCORECARD CRITIQUE

_____ Level of Expertise:____ A (beginner)
Name(s) of responder or club ____ B
Address:_____ ____ C
_____ ____ D
_____ ____ E (expert)
Tele. No.:_____
Number of years Mountain biking:_____
Position or Title:_____
Do you object to being quoted in the project narrative? _____ NO _____ YES

A. What additional criteria would you recommend? (such as stream crossings, length of trail or time to ride the trail) What guidelines would you use in quantifying that criteria?

B. What Rating values should be different on the proposed scorecard, and do you agree with the values?

C. What are your feelings on rating a trail one category lower than the most difficult stretch on that trail, if that stretch is "short" or/when infrequent? How much is short and infrequent? Do you feel the rating should be at the most difficult level found on the trail no matter how short that stretch is? Is it acceptable to push the bike for short distances.

D. Do you feel each criteria value should be assigned a value and values added together would determine the level of difficulty as in scorecard 2? Do you aggree with this system? Are the point values realistic? (Example: If all trail conditons are difficult (category/value 3), except pitch and grade which are category/value 5, for a total of 28 points, then the rating of difficulty would be "more difficult" if the levels of difficulty were: easy(8-11 pts.), easier (12-20 pts.), somewhat difficult (21-27 pts.), more difficult (28-34 pts.), and most difficult (35+
pts.).

E. Are there any other suggestions or comments you would like to add?

Signature: _____

Appendix 5
(Continued)

MOUNTAIN BIKE CLUB MAILING LIST

Alki Bicycle Club
1022 Alki Ave. SW
Seattle, WA 98116

Arizona Bicycle Sports Assoc.
P. O. Box 30776
Tucson, AZ 85751

Bicycle Center
1206 S. Pacific Coast Highway
Redondo Beach, CA 90277

Bicycle Harbor-Tempe
6316 S. Grice
Tempe, AZ 85282

Bike Works
P. O. Box 3189
Taos, NM 87571

Bluegrass Wheelmen
P.O. Box 1397
Lexington, KY 40591

Boston Road Club
16 Unity Ave.
Belmont, MA 02178

Chain Reaction Cycling Club
c/o Bikeworld
830 Joe Clifton Dr.
Paducah, KY 42001

COBRA
710 W. Main St. #101
Cincinnati, OH 45140

CORBA
15236 Victory Blvd. Box 149
Van Nuys, CA 91411

Corvallis Racing Club
Peak Sports
129 NW 2nd
Corvallis, OR 97330

Coulee Climbers
1501 Rose St. #32
LaCrosse, WI 54603

Desert Off-Road Bicycle Group
2150 Deborah
Palm Springs, CA 92262

Eagle Riders Mountain Bike Club
c/o Springfield Schwinn Cyclery
1300 Mitchell Blvd.
Springfield, OH 45503

Europa Mountain Bikes
6409 Van Nuys Blvd.
Van Nuys, CA 91401

Farmington Valley Mountain Bikers
c/o The Bicycle Cellar
532 Hopmeadow St.
Simsbury, CT 06070

Fat of The Land
805 Cable Dr.
Tallahassee, FL 32301

Fat Tire Samurai
Nevada City, CA 95959

Haven Cyclery
6331 Haven Ave. Suite 13
Alta Loma, CA 91701

Hawley's ATB Club
2515 Broad River Rd.
Columbia, SC 29210

IMBA
P. O. Box 2007
Saratoga, CA 95070-0007

Kapu Oahu
c/o Fred Harris
Ala Moana Center #1042
1450 Ala Moana Blvd.
Honolulu, Hi 96841

Kentucky Trail Men
1103 So. First St.
Louisville, KY 40203

Kingston Rocky Road Riders
562 Albert St.
Kingston, Ontario
Canada K7K 4M4

Mirada Bike Shop
14225 E. Imperial Highway
La Mirada, CA 90683

Laguna Rads
P. O. Box 4283
Laguna Beach, CA 92652

Mount Wilson Trail Association
P. O. Box 80370
San Marino, CA 91108

Mountain Bikers of Alaska
4107 Charing Cross
Anchorage, AK 99504

Mountain Outdoor Expeditions
P. O. Box 86
Ellijay, GA 30540

Nashville Bicycle Club
P. O. Box 158593
Nashville, TN 37212

San Juan Cyclist
657 Maple St.
Farmington, NM 87401

Santa Cruz Cycling Club
414-1/2 Soquel Ave.
Santa Cruz, CA 95060

Sarasota Bicycle Club
4318 Rockefeller Ave.
Sarasota, FL 33481

SDSU Mountain Bike Club
Aztec Center
5300 Campanile Dr.
San Diego, CA 92182

Siskiyou Wheelmen
1729 Siskiyou Blvd.
Ashland, OR 97520

Sunrise Schwinn
1322 Fourth Ave.
Yuma, AZ 85364

Tarheel Cyclist, Inc.
P. O. Box 35392
Charlotte, NC 28235

Team Big Bear
P. O. Box 3965
Big Bear Lake, CA 92315

Appendix 6
(Continued)

Team Managers Bike Co.,/
Summit County Velo Club
P. O. Box 647
Frisco, CO 80443

Timp Velo
670 S. Main
Payson, UT 84651

Trail Center
4898 El Camino Real, #205 A
Los Altos, CA 94022

Two Wheel Drive
1706 Central S.E.
Albuquerque, NM 87106

Vancouver Off-Road Cycling Club
c/o Bike Cellar
1856 W. 4th Ave.
Vancouver, B. C.
Canada V6J 1M3

West Elk Road Club
c/o The Tuneup Ski & Bike Shop
222 N. Main
Gunnison, CO 81230

White Clay Bicycle Club
4960 S. Raintree Court
Wilmington, Delaware 19808

National Forests Responding to Questionaires
(and the Number of Responses)

Region 1

- Idaho Panhandle (1)
- Flathead (3)
- Nez Perce (1)
- Beaverhead (1)

Region 2

- San Juan (8)

Region 3

- Coconino (1)
- Tonto (2)

Region 4

- Manti-LaSal (2)
- Uinta (1)
- Wasatch-Cache (1)
- Caribou (1)
- Ashley (1)
- Targhee (1)
- Sawtooth (1)

Region 5

- Los Padres (1)
- Klamath (1)
- Inyo (2)
- Siuslaw (1)

Region 6

- Winema (1)
- Malheur (2)
- Fremont (1)
- Wenatchee (2)
- Gifford Pinchot (1)
- Okanogen (2)

Region 8

- Cherokee (1)
- Talladega (1)
- Ouachita (1)
- Regional Office (1)

Region 9

- Monongahela (4)

* Short is less than or equal to 2% - also depends on number (1)
* Short equals 100-300' and infrequent equals <3/mile (1)
* Rate portage as tough and leave the rest open to judgement (1)
* Levels should be rated for both technical and physical difficulties (1)

Many bikers have no objection to pushing the bike. After traveling a number of trails and roads, the author feels most bikers will expect the need to get off and push the bike on some of the backroads and trails. This feeling was supported by Borton (1990) who, unlike the author, is an expert biker with 10 years of experience. Barnes and Kuehne (1988) made the comment that bikers need to be willing to push the bike up much of the Slickrock Trail near Moab, Utah, as well as push the bike through an occasional sand pit. They consider it an integral part of riding the trail and should be done "shamelessly". This trail, however, is not an easy trail.

Twenty six responses indicated ratings should be at the level that fits the majority of the trail, and that more difficult stretches are acceptable if steep pitches were short and infrequent. There were a lot of opinions about what is short and what is infrequent. The scorecard values for length of pitch seemed to agree with many responses. Platz (1990) felt a lower rating would give the biker a better challenge. Others felt that by not rating at the highest level, the government would be liable should an injury occur.

Liability will be discussed later as well as why terminology for trail difficulty was changed. Portman (1990) felt ratings should be both technical and physical.

Question D. Do you feel each criteria should be assigned a value and the values added together to determine the level of difficulty as in scorecard 2? Do you agree with this system? Are the point values realistic?

* Agree (19)
* Consistency and standards are important (1)
* Generalize the values ie. "piece of cake" or "really hard" (1)
* Because of opinions, scorecard is good for evaluator and not user (1)
* Realistic, but hard to get ratings where should be (1)
* Agree, but grades are worth 2 times the others (1)
* Rate mainly grade (1)
* Not agreeable-too confusing (2)

Basically it appears that most are in favor of criteria and values assigned to scorecard 2 (19 respondents agreed). Of course, levels of difficulty and values assigned to each criteria can always be debated (Moon 1990). To generalize by calling a criteria either "a piece of cake" or "really hard" leaves nothing changed and everyone developing their own standard which this project is attempting to change. Words used to describe the various criteria are more misleading than informative as people interpret wording differently (Ortenburger 1979). Still, consistency and standards are important (Jones 1990). A few words were used in this scorecard. Their use helped "keep it simple".

Question E. Are there any other suggestions or comments you would like to add?

* Change titles of levels of difficulty-have problems with easy, easier,

easiest type terminology (11)

* Simplify(8)
* OK (1)
* Use ratings similar to white water or mountain climbing (1)

It appears the titles for the various levels of difficulty on the proposed scorecard were acceptable to those answering the questionaire. Eleven respondents felt the titles were acceptable, but an additional eight felt the system needed to be simplified. The terminology of the trail ratings has been changed and are similar to those used in the Forest Service Handbook.

In the past, ski area management designated ski runs by terminology that related to the level of a skier's ability-such as the term "expert". When taking lessons, skiers were divided into groups according to ability and these terms were applied to the skiers as well. An expert skier should be able to ski an expert slope. However, if an expert skier skied an intermediate slope and sustained an injury, a question of liability surfaced. Presently, skiers are classed differently with terms like "snowplows", or "skis parallel", etc. (Burns 1990). Joe Stringer (1990), an attorney for the Office of General Counsel, located at the Forest Service Regional Office in Ogden, Utah, suggested terms on the scorecard be applied to rating the trail and not the bike rider. This meant changing the terms used in the final scorecard.

Of those responses indicating a preference for one or the other initial scorecards, responses were 13 to 4 in favor of the second scorecard. As one responder (Nelson 1990) put it, values leading up to an overall rating look

good. Not many responses indicated why one scorecard was preferred over the another. These scorecards are located in the Appendix.

Five responses indicated a desire for aesthetic information and one indicated an interest in historical information. These factors do not effect the difficulty of a trail but as information can be helpful later when brochures and guide books are being developed. This information has been included on the back of the scorecard to be used as ideas for comment.

Many (25 responses) listed elevation as a need in rating the level of difficulty. By knowing the elevation changes over the length of the trail, and by knowing where these grades occur, bikers can pace their energy consumption. As it is difficult to show where the elevation changes occur, the author chose to indicate the maximum and minimum elevations in the heading of the scorecard. The maximum pitch and sustained grade give a rider an idea on elevation gained and lost. Elevation is also important to those who travel long distances across the United States to partake in a ride that occurs at an altitude much higher than their home station. One needs to acclimate to these new elevations.

A blank graph on the back of the scorecard is available to the rater for graphing the elevation changes over the length of the trail. This added information will be handy if the information is transferred to a guidebook or brochure that is to be developed for the trail or area.

Although time to travel is not a criteria deserving attention in developing a level of difficulty, it is important when selecting a trail to ride - and time

to complete is a factor. Knowing the length and having a standardized difficulty rating on a trail, the time required to travel can be estimated quite closely if the rider has some knowledge of his or her capabilities. Time to travel is dependent upon the rider's ability and is viewed differently among riders. If desired, this information can be entered in the space provided for comments. Time was indicated as an interest by 20 responses.

Season of use is also not a criteria contributing to the development of a level of difficulty. It was indicated as a need on 4 responses. This information can be included in the comment section or be left up to the biker to make his/her own decision. Caution should be exercised in projecting specific dates as seasonal weather changes do not occur on absolute dates from year to year.

Interest in the safety aspects of biking were not used in the development of the levels of difficulty. This information should be included in the comment section. The importance of safety cannot be overstressed.

A number of suggestions (6) were provided indicating loops as a means to keep bikers going the same direction and avoiding conflicts. Space was provided at the top of the scorecard to indicate whether a trail was a loop, spur, or a connecting trail to another trail system.

Conflicts were identified thirteen times as an item of concern. Conflicts, however, are directly related to the other safety concerns mentioned earlier. It merits more discussion than just being mentioned. The nearer a trail is to a population center, the greater the potential for a conflict.

Two responses indicated strong opposition to the rating of trails for a particular use. Both responses came from population centers in southern California. One responder did not wish to be quoted. The other had no objections to being quoted. The "Kepner-Trego Analysis", a paper on the mountain bicycle situation on the Santa Barbara Front Trails located on the Santa Barbara Ranger District of the Los Padres National Forest and completed in August of 1987, discusses a potential conflict that exists between four major user groups-specifically hikers, equestrians (horseriders), bicyclists, and the Sierra Club. Rumors, letters, and complaints about conflicts seemed to be numerous. Another concern centered around erosion.

In the Santa Barbara case, the Forest Supervisor challenged the groups to work together and come to an agreement if in fact a problem existed, and if so, develop a solution. There were a lot of ideas and solutions to the problem but none could be agreed upon. The basic problem was renegade mountain bikers who disregarded good trail ethics. After gathering needed information, it was decided that the problem was not as significant as once thought, and that the Forest Service did not need to change their management practices which included placing signs, and trying to educate the public on proper use ethics. The problem would become worse if mountain bike use increased - a factor which may bring about regulations on mountain bike use. In the meantime, the district is managing trails in order to slow bikers down. They do not wish to advertise by rating the trail for a level of difficulty and consequently encourage more use (Jensen 1990).

Steep descents, poor visibility, and renegade mountain bikers seeking the exhilarating, gonzo, aerobic ride downhill can definitely pose problems. A

biker on a trail meeting a family with a child up front could spell disaster! One way loops and comments about poor visibility could prevent some of these problems.

Other safety concerns that were mentioned at least once were: lightning risk, speed limits, signing of danger areas, fun or aerobic, per cent rock, ratingrisks and hazards, tread type, restrictions, flash floods, cliffs, poisonous plants, availability of medical facilities, availability of food and water, dangerous stream crossings, cactus, dangerous switchbacks, and how far would a rider fall if he or she and the bike had an accident.

Conclusion

The criteria and values used for developing the levels of difficulty for mountain bike trails are subjective. The proposed scorecard has incorporated many of the suggestions provided by the survey. It cannot incorporate all suggestions, nor can it satisfy the preference of all of those who responded.

The intent of this project was to increase the pleasure and safety of the biking public by developing a scorecard that would bring the trail bikers and the trail manager closer in their understanding of the resource and promote a language relating to trail difficulty that will become standard. As few words as possible were used to describe the level of difficulty since words are too often misleading and individuals interpret the words differently. However, the true test of the scorecard's value will come as it is used by trail bikers and trail managers.

What Next

The scorecard needs more time to be tested. It is hoped that the levels of difficulty are realistic and that the criteria and associated values are accepted as a valid sum of the information received by the author.

In order to truly incorporate this scorecard into national field use, the country's various regions would need to encourage trail managers to rate the trails accordingly and then distribute this information to the public. Dissemination of this information could be done by national forest offices, park entrances, and trailheads by furnishing brochures in box dispensers, brochure racks, and yes, through rangers. Of course, the advertising departments could also publicize the scorecard's availability, and it could be used by the Department of Tourism for each region.

As the originator of the national scorecard, the author feels it is his responsibility to help publicize and encourage its use. While that could mean submitting articles to bikers' magazines, it most certainly will also mean speaking to other forest personnel and to the general public in both formal and informal settings. Perhaps changes will need to be made, but first managers and mountain bike riders must begin by using the card.

Eventually it may be possible for the card to broaden the information included through the use of symbols. These might include a tent for camping, a table for picnicking, a pine tree for sceneic view, a liberty bell or hatchet for historical site, etc. The symbols would appear on the card, but explanations would be provided in public information centers or brochures.

In any case, a national scorecard can be a tool to increased enjoyment and safety of all trails used by mountain bikes. Next time you ride, be sure to ask to see the scorecard rating for your trail and if it has not been rated, ask for a copy of the scorecard and rate the trail for yourself!! Let's make it national!

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APPENDICES